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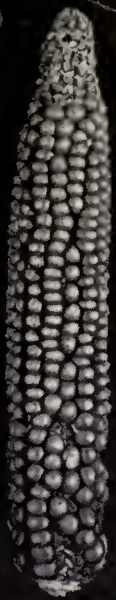

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Two New Illinois
INBRED LINES OF CORN

By R. W. Jugenheimer
E. R. Leng
C. M. Woodworth

Bulletin 523 University of Illinois Agricultural Experiment Station

COVER PICTURES

The ears and kernels shown in the photographs on the cover are typical of the two new Illinois inbreds, R59 and R61, and of Iowa L317. In the development of R59, L317 was prominently used.

The ear of R59 is shorter than that of L317 and has greater girth. The kernels are in straighter rows and of better type. The irregular rows of R61 are typical of this inbred line.

Fronts and backs of typical kernels of each inbred line are shown directly under the ear. Kernels in the first two columns are from R59, the next from R61, and the last from L317.

Urbana, Illinois May 1, 1947

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TWO NEW ILLINOIS INBRED LINES OF CORN

By R. W. Jugenheimer, E. R. Leng, and C. M. Woodworth[1]

TWO NEW MIDSEASON yellow inbred lines of corn, R59 and R61, were officially released by the Illinois Agricultural Experiment Station on March 15, 1947. They were developed by Oren Bolin[2] while he was associated with the corn-improvement project at the Illinois Station.

Inbred R59

R59 was developed from a cross of Iowa L317 × Illinois Low Ear backcrossed once to L317, then selfed until uniform. This line is therefore closely related to L317 and may be substituted for it in hybrid combinations. R59 silks slightly earlier than L317, the plant is shorter, and more resistant to smut, and the ears are lower. R59 has a shorter, thicker ear with larger kernels than L317 (see Table 1 and cover pictures).

R59 hybrids appear to be superior to L317 hybrids in yield, in having lower ears, slightly larger ears, and a higher shelling percentage. Altho R59 hybrids tend to silk earlier than those of L317, the seed at harvest contains more moisture. Hybrids of R59 are similar to those of L317 in having somewhat weak stalks (Tables 2, 3, and 4).

The performance in 1946 of fourteen Illinois hybrids containing inbred R59 is shown in Table 5.

Inbred R61

R61 is a rather attractive inbred developed from a commercial hybrid which had been crossed with a four-year selfed line out of Lancaster yellow dent, backcrossed once to the Lancaster line, and then selfed until uniform. Plant and ear characteristics are given in Table 1. Typical ears and kernels are shown in cover pictures.

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Table 1. — PLANT AND EAR CHARACTERISTICS OF INBREDS R59, L317, AND R61: Urbana, Illinois, 1946

Inbred line	Days from planting to half-silk	Height		Smutted plants	Suckers	Size of ear		Rows of kernels
		Plant	Ear			Length	Circumference	
		ft.	*in.*	*perct.*	*perct.*	*in.*	*in.*	
Ill. R59, green silk, purple anther	76	6.5	26	0	0	5.7	5.2	12
Iowa L317, green silk, red anther	77	7.5	48	7	0	7.6	4.4	14
Ill. R61, green silk, purple anther	76	6.5	32	0	0	6.7	4.9	16

Table 2. — PERFORMANCE OF INBREDS R59 AND L317 IN SINGLE CROSSES: Summary for 1945 and 1946, Urbana, Illinois

Parent lines ▷ / ▽	Ill. Hy	Ind. WF9	Ind. 38-11	Kans. K4	Mean
Acre-yield, bushels					
Ill. R59	108.0	94.0	104.8	103.7	102.6
Iowa L317	104.4	85.9	90.5	87.5	92.1
Moisture in grain at harvest, percent					
Ill. R59	25.7	23.3	23.1	27.1	24.8
Iowa L317	24.2	20.6	20.6	27.5	23.3
Shelling percentage					
Ill. R59	83.4	83.5	84.7	83.1	83.7
Iowa L317	82.3	81.9	82.0	79.7	81.4
Erect plants at harvest, percent					
Ill. R59	71	69	78	40	64
Iowa L317	69	68	63	38	59
Root-lodged plants at harvest, percent					
Ill. R59	11	11	4	31	14
Iowa L317	12	21	11	31	19
Stalk-lodged plants at harvest, percent					
Ill. R59	19	21	19	30	22
Iowa L317	19	12	27	32	22
Number of ears per hundred pounds					
Ill. R59	133	140	150	156	145
Iowa L317	136	154	149	172	153

Table 3. — PERFORMANCE OF INBREDS R59, R61, AND L317 IN SINGLE CROSSES: Wyoming, Illinois, 1945

(Means of eight replications)

Parent lines ▷ ◁	Ill. Hy	CI. 187-2	Ind. WF9	Ill. RR98	Ind. 38-11	Mean
Acre-yield, bushels						
Iowa L317	69	67	72	62	63	66.6
Ill. R59	73	65	70	58	62	65.6
Ill. R61	64	63	..	65	65	64.2
Moisture in grain at harvest, percent						
Ill. R61	23.1	21.9	....	22.5	21.2	22.2
Iowa L317	26.3	23.6	21.8	25.7	20.9	23.7
Ill. R59	24.9	24.1	23.6	29.4	27.4	25.9
Root-lodged plants at harvest, percent						
Ill. R61	41	89	..	76	63	67
Ill. R59	89	79	86	96	80	86
Iowa L317	85	91	92	93	76	87
Stalk lodging due to corn borer injury, percent						
Ill. R61	26	26	..	40	24	29
Iowa L317	30	35	24	33	41	33
Ill. R59	32	46	28	33	39	36

In its ability to transmit desirable characteristics, R61 appears to be equal to or superior to such standard inbreds as Iowa L317, Illinois Hy, Indiana WF9, Ohio O7, Indiana 38-11, CI. 187-2, and Illinois 5120B (Tables 3 and 4).

The performance at Urbana and Bluffs of ten new Illinois hybrids containing inbred R61 is shown in Table 6. Hybrids of R59 and R61 in Tables 5 and 6 were grown in the same tests and can be directly compared. Performance at Aurora of six Illinois hybrids containing inbred R61 is given in Table 7.

L317 and R61 appear to be somewhat related and for best performance should not be used on opposite sides of a double cross.

Table 4. — PERFORMANCE OF 4 INBRED LINES IN SINGLE CROSSES: Urbana, Illinois, 1946

(Means of three replications)

Parent lines ▷ / ◁	Ohio O7	CI. 187-2	Ill. 5120B	Kans. K4	Ind. WF9	Ind. 38-11	Mean	Ill. Hy-2	Ill. M14	Iowa KrOsf
Acre-yield, bushels										
Ill. R59	124.9	115.4	121.9	118.2	112.2	117.2	**118.3**	121.3	106.4	99.6
Ill. R61	118.1	125.7	120.8	120.6	111.9	105.3	**117.1**	120.2	103.9	....
Ill. Hy-2	119.6	121.9	113.0	115.7	112.5	117.0	**116.6**	.....	.....	87.0
Iowa L317	122.1	117.7	122.5	100.6	113.8	104.3	**113.5**	118.8	104.1	113.0
Mean	121.2	120.2	119.6	113.8	112.6	111.0	**116.4**	120.1	104.8	99.9
A difference of less than 8.3 bushels between yields of any two of the above entries is not significant.										
Days from planting until half-silk										
Ill. R59	66	67	67	71	67	69	**68**	68	64	67
Ill. R61	68	68	68	72	66	67	**68**	67	65	..
Ill. Hy-2	67	68	67	70	65	68	**68**	..	..	72
Iowa L317	69	69	68	74	68	69	**70**	68	65	69
Mean	68	68	68	72	67	68	**68**	68	65	69
Moisture in grain at harvest, percent										
Ill. R61	24.4	23.5	26.8	28.2	24.9	24.9	**25.5**	27.4	26.4	....
Iowa L317	24.1	24.3	29.0	31.5	22.8	22.3	**25.7**	27.0	30.5	27.9
Ill. Hy-2	23.0	26.4	29.3	27.9	27.1	24.9	**26.4**	....	....	28.1
Ill. R59	25.8	25.5	30.2	30.9	26.4	26.1	**27.5**	29.1	29.3	30.6
Mean	24.3	24.9	28.8	29.6	25.3	24.6	**26.3**	27.8	28.7	28.9
Shelling percentage										
Ill. R59	87.7	86.8	81.8	85.5	85.2	86.7	**85.6**	84.5	86.4	84.1
Ill. R61	85.8	86.0	82.1	83.2	86.4	83.8	**84.6**	85.0	85.6	....
Ill. Hy-2	86.5	83.6	80.4	83.8	84.1	84.2	**83.8**	....	....	82.7
Iowa L317	85.7	85.7	81.7	82.1	84.1	83.0	**83.7**	84.0	85.6	84.0
Mean	86.4	85.5	81.5	83.7	85.0	84.4	**84.4**	84.5	85.7	83.6
Erect plants at harvest, percent										
Ill. Hy-2	99	96	90	100	99	98	**97**	..	..	72
Ill. R61	96	89	74	84	97	79	**87**	95	95	..
Ill. R59	94	90	71	59	92	92	**83**	85	99	67
Iowa L317	91	58	91	53	98	74	**78**	94	98	47
Mean	95	83	82	74	97	86	**86**	91	97	62
Root-lodged plants at harvest, percent										
Ill. Hy-2	1	3	0	0	0	0	**1**	..	..	0
Ill. R61	4	0	0	10	0	0	**2**	0	0	..
Ill. R59	0	0	2	15	0	0	**3**	6	0	0
Iowa L317	5	0	2	16	0	0	**4**	0	0	12
Mean	3	1	1	10	0	0	**2**	2	0	4
Stalk-lodged plants at harvest, percent										
Ill. Hy-2	0	1	10	0	1	2	**2**	..	..	28
Ill. R61	0	11	26	6	3	21	**11**	5	5	..
Ill. R59	6	10	27	26	8	8	**14**	9	1	33
Iowa L317	4	42	7	31	2	26	**19**	6	2	41
Mean	3	16	18	16	4	14	**12**	7	3	34

Table 4. — Performance of 4 Inbreds — Concluded

(Means of three replications)

Parent lines	Ohio O7	CI. 187-2	Ill. 5120B	Kans. K4	Ind. WF9	Ind. 38-11	**Mean**	Ill. Hy-2	Ill. M14	Iowa KrOsf
Plant height, feet										
Ill. R61	9.2	8.7	9.7	9.3	8.5	9.0	**9.1**	9.0	8.7	...
Ill. R59	9.3	9.2	9.7	9.5	9.2	9.2	**9.4**	9.5	8.2	8.7
Ill. Hy-2	9.5	9.8	10.0	10.0	8.8	9.5	**9.6**	...	...	8.7
Iowa L317	9.8	9.7	9.8	10.0	9.7	10.2	**9.9**	9.5	8.8	9.7
Mean	9.5	9.4	9.8	9.7	9.1	9.5	**9.5**	9.3	8.6	9.0
Ear height, inches										
Ill. R61	40	44	49	51	35	43	**44**	46	36	..
Ill. R59	43	44	47	46	43	43	**44**	47	34	43
Ill. Hy-2	46	49	50	50	39	49	**47**	..	..	45
Iowa L317	41	51	48	55	41	53	**48**	51	38	50
Mean	43	47	49	51	40	47	**46**	48	36	46
Number of ears per hundred pounds										
Ill. R61	126	121	121	120	134	151	**129**	126	134	...
Ill. Hy-2	136	128	121	125	132	135	**130**	...	...	161
Ill. R59	134	132	111	143	135	136	**132**	122	140	138
Iowa L317	134	133	110	142	144	137	**133**	125	140	136
Mean	133	129	116	133	136	140	**131**	124	138	145
Suckers per hundred plants										
Iowa L317	2	3	3	3	3	3	**3**	6	2	7
Ill. Hy-2	8	4	2	2	1	2	**3**	..	..	8
Ill. R59	4	0	13	2	5	2	**4**	4	5	3
Ill. R61	5	1	11	3	1	29	**8**	7	12	..
Mean	5	2	7	3	3	7	**5**	6	6	6
Dropped ears, percent										
Ill. Hy-2	0	0	0	0	0	0	**0**	..	..	0
Ill. R59	0	0	2	0	0	0	**.3**	0	0	0
Ill. R61	0	0	0	1	0	2	**.5**	0	1	..
Iowa L317	0	0	2	0	0	13	**2.5**	0	0	1
Mean	0	0	1.0	.3	0	3.8	**.8**	0	.3	.3

Table 5. — PERFORMANCE OF DOUBLE-CROSS HYBRIDS, 14 CONTAINING AND 7 NOT CONTAINING INBRED R59: Urbana and Bluffs, Illinois, 1946

(Means of six replications; starred entries do not contain R59)

Rank in yield	Hybrid and pedigree	Acre-yield of shelled corn	Days to half-silk	Moisture at harvest	Erect plants	Height	
						Plant	Ear
		bu.		*perct.*	*perct.*	*ft.*	*in.*
1	Ill. 246-3 (WF9×Hy) (R59×187-2)....	120.5	67	22.2	83	10.2	52
2*	Ill. 1342 (U.S.13) (WF9×38-11) (Hy×L317)...	119.0	68	20.4	84	10.5	52
3*	Ill. 247 (187-2×38-11) (Hy×L317)...	118.5	69	22.8	76	10.7	52
4	Ill. 1233-1 (WF9×38-11) (940×R59)....	118.4	69	23.4	88	9.9	50
5*	Ill. 246 (WF9×Hy) (187-2×L317)...	117.4	70	21.5	72	10.5	50
6	Ill. 1300 (WF9×38-11) (R2×R59)....	116.8	68	21.6	75	10.1	50
6*	Ill. 200 (WF9×38-11) (K4×L317)...	116.8	70	21.6	82	10.2	50
8	Ill. 1305 (K4×H7) (R59×940).....	115.5	70	24.0	88	10.0	47
9	Ill. 201-3 (WF9×38-11) (R59×187-2)..	114.0	67	22.7	76	9.8	48
10	Ill. 1329 (O7×R61) (187-2×R59).....	112.7	67	21.6	78	9.4	46
11*	Ill. 21 (WF9×38 11) (187-2×Hy)...	111.2	68	20.6	88	10.2	50
12*	Ill. 201 (WF9×38-11) (187-2×L317)	111.1	68	23.0	75	10.2	49
13	Ill. 1348 (38-11×940) (R59×K148)...	110.8	69	25.6	72	9.8	48
14	Ill. 1312 (K4×R59) (38-11×K155)....	107.8	72	24.4	82	10.3	53
15*	Ill. 206 (WF9×38-11) (5120×L317)	107.4	68	21.8	79	10.4	50
16	Ill. 206-1 (WF9×38-11) (R59×5120)...	106.6	67	23.6	92	9.6	45
17	Ill. 1335 (WF9×38-11) (R59×K148)..	106.2	68	24.2	84	10.0	46
18	Ill. 1314 (K4×R59) (K201C×Kys)...	104.6	75	25.4	56	10.5	57
19	Ill. 200-1 (WF9×38-11) (K4×R59)....	98.4	70	23.6	73	10.4	53
20	Ill. 1343 (WF9×K155) (R59×Hy)....	96.7	67	23.4	75	9.9	48
21	Ill. 1330 (O7×187-2) (R59×Hy).....	91.8	63	21.1	72	8.6	36
	Mean.....	110.6	69	22.8	79	10.1	49

A difference of less than 10.3 bushels between yields of any two of the above entries is not significant.

Table 6. — PERFORMANCE OF DOUBLE-CROSS HYBRIDS, 10 CONTAINING AND 7 NOT CONTAINING INBRED R61: Urbana and Bluffs, Illinois, 1946

(Means of six replications; starred entries do not contain R61)

Rank in yield	Hybrid and pedigree	Acre-yield of shelled corn	Days to half-silk	Moisture at harvest	Erect plants	Height	
						Plant	Ear
		bu.		*perct.*	*perct.*	*ft.*	*in.*
1	Ill. 1336 (WF9×38-11) (R61×5120B)	120.2	68	21.2	78	9.9	48
2	Ill. 1246 (WF9×38-11) (R61×187-2)..	120.1	67	21.4	84	9.9	48
3*	Ill. 1342 (U.S.13) (WF9×38-11) (Hy×L317)...	119.0	68	20.4	84	10.5	52
4*	Ill. 247 (187-2×38-11) (Hy×L317)...	118.5	69	22.8	76	10.7	52
5	Ill. 1247 (WF9×38-11) (R61×L317)...	118.4	68	21.4	76	10.2	50
6*	Ill. 246 (WF9×Hy) (187-2×L317)...	117.4	70	21.5	72	10.5	50
7*	Ill. 200 (WF9×38-11) (K4×L317)...	116.8	70	21.6	82	10.2	50
8	Ill. 1248 (WF9×38-11) (O7×R61)....	115.6	68	21.3	90	9.4	48
9	Ill. 1337 (WF9×38-11) (Hy-2×R61)..	114.9	67	22.4	84	9.9	50
10	Ill. 1345 (WF9×Hy) (R61×L317)....	113.0	68	24.4	72	10.2	50
11	Ill. 1329 (O7×R61) (187-2×R59).....	112.7	67	21.6	78	9.4	46
12*	Ill. 21 (WF9×38-11) (187-2×Hy)...	111.2	68	20.6	88	10.2	50
13*	Ill. 201 (WF9×38-11) (187-2×L317)	111.1	68	23.0	75	10.2	49
14	Ill. 1301 (WF9×38-11) (R2×R61)....	108.6	67	20.2	93	10.0	48
15*	Ill. 206 (WF9×38-11) (5120×L317)..	107.4	68	21.8	79	10.4	50
16	Ill. 1353 (O7×R61) (WF9×Hy).....	104.8	66	22.9	87	9.8	44
17	Ill. 1351 (WF9×R61) (38-11×L317)...	104.0	70	20.5	80	10.2	53
	Mean.....	113.7	68	21.7	81	10.1	49

A difference of less than 10.3 bushels between yields of any two of the above entries is not significant.

Table 7. — PERFORMANCE OF DOUBLE-CROSS HYBRIDS, 6 CONTAINING AND 6 NOT CONTAINING INBRED R61: Aurora, Illinois, 1946

(Means of four replications; starred entries do not contain R61)

Rank in yield	Hybrid	Pedigree	Acre-yield of shelled corn	Moisture at harvest	Erect plants
			bu.	*perct.*	*perct.*
1	Ill. 1263	(WF9×R61) (R2×Hy)	83.8	21.2	87
2	Ill. 1261	(WF9×M14) (R2×R61)	80.9	19.3	88
3	Ill. 1267	(O7×R61) (187-2×Hy)	80.2	21.3	97
4*	Ill. 307	(WF9×M14) (CC5×CC7)	80.0	19.8	83
5	Ill. 1253	(WF9×R2) (Hy-2×R61)	78.4	20.9	86
5	Ill. 1285	(WF9×Y82) (M14×R61)	78.4	21.5	87
7*	Ill. 751	(WF9×Hy) (A×90)	75.9	22.1	82
8*	Ill. 972A-1	(WF9×O7) (Hy×L317)	75.6	22.4	97
9*	Ill. 101	(WF9×M14) (CC7×187-2)	75.2	20.7	88
10	Ill. 1237	(WF9×Hy) (R61×187-2)	73.7	22.3	94
11*	Ill. 1180	(WF9×M14) (CC10×CC24)	73.3	20.1	83
12*	U.S. 44-1	(4-8×187-2) (Hy×O7)	67.7	21.7	94
	Mean		76.9	21.1	89

A difference of less than 7.2 bushels between yields of any two of the above entries is not significant.

DISTRIBUTION OF INBRED LINES

Each year the Illinois Station has available for distribution hand-pollinated seed of a number of inbred lines of corn. These are lines that are being used to develop promising experimental hybrids and lines that have been used in hybrids widely grown by Illinois farmers.

A list of available lines and details regarding them can be obtained from the Department of Agronomy, Illinois Agricultural Experiment Station, Urbana, Illinois. Inbred lines R59 and R61 are included in the 1947 list.

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